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IS 1384 (1999): Oil Pressure Lanterns [MED 26: Oil Burning Appliances]

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तेल दाब लालटेन – विशिष्टि

(तीसरा पुनरीक्षण)

Indian Standard

OIL PRESSURE LANTERNS — SPECIFICATION

(Third Revision)

ICS 91.160.01; 97.180

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

July 1999 **Price Group 5**

Oil Burning Appliances Sectional Committee, HMD 26

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Oil Burning Appliances Sectional Committee had been approved by the Heavy Mechanical Engineering Division Council.

This standard was first published in 1959 and subsequently revised in 1964 and 1977. This third revision of this standard has been necessitated as a result of experience gained through its implementation by the industry as well as the consumers during the past years. In this revision, a number of provisions relating to the materials, dimensions and finish of some of the important components have been incorporated in order to make the standard more acceptable to its users.

Mantles play a very significant part in the performance of the lanterns and it is important that the mantles should have a reasonable life under actual service conditions. The performance requirements for mantles have been covered in IS 2788 : 1981'Gas mantles (*first revision*)', whereas the mantle holder which is another important component of oil pressure lantern, has been separately covered in IS 4957 : 1968 'Mantle holders, nozzle type' (*see* **6.5** and **6.6**).

This standard contains **6.2.2**, **6.3.6**, **6.4.1** and **7.1** which permit the purchaser to use his option or to agree with the manufacturer or supplier for selection to suit his requirements.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard
OIL PRESSURE LANTERNS — SPECIFICATION
(Third Revision)

1 SCOPE

1.1 This standard covers the requirements for five sizes of oil pressure lanterns, burning pressurized kerosine under a working pressure not exceeding 195 kN/m^2 (2 kgf/cm^2).

2 REFERENCES

The Indian Standards listed in Annex A contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 NOMENCLATURE

3.1 For the purpose of this standard, the nomenclature of the different parts shall be as indicated in Fig. 1.

4 SIZES

4.1 The various sizes of pressure lanterns along with the rated luminous intensity and overall height corresponding to each size shall be as follows:

Size (Designation)	*Rated Luminous Intensity Candelas (Nom) (see* **8.2.1***)*	*Overall Height (Excluding the Carrying Handle)* mm
1	100	285 ± 15
2	200	330 ± 15
3A	300	395 ± 15
3B	350	395 ± 15
3C	400	395 ± 15

5 MATERIALS

5.1 The materials used in the manufacture of different parts of oil pressure lantern shall be such that they ensure safe handling and good performance of the lantern throughout its reasonable life.

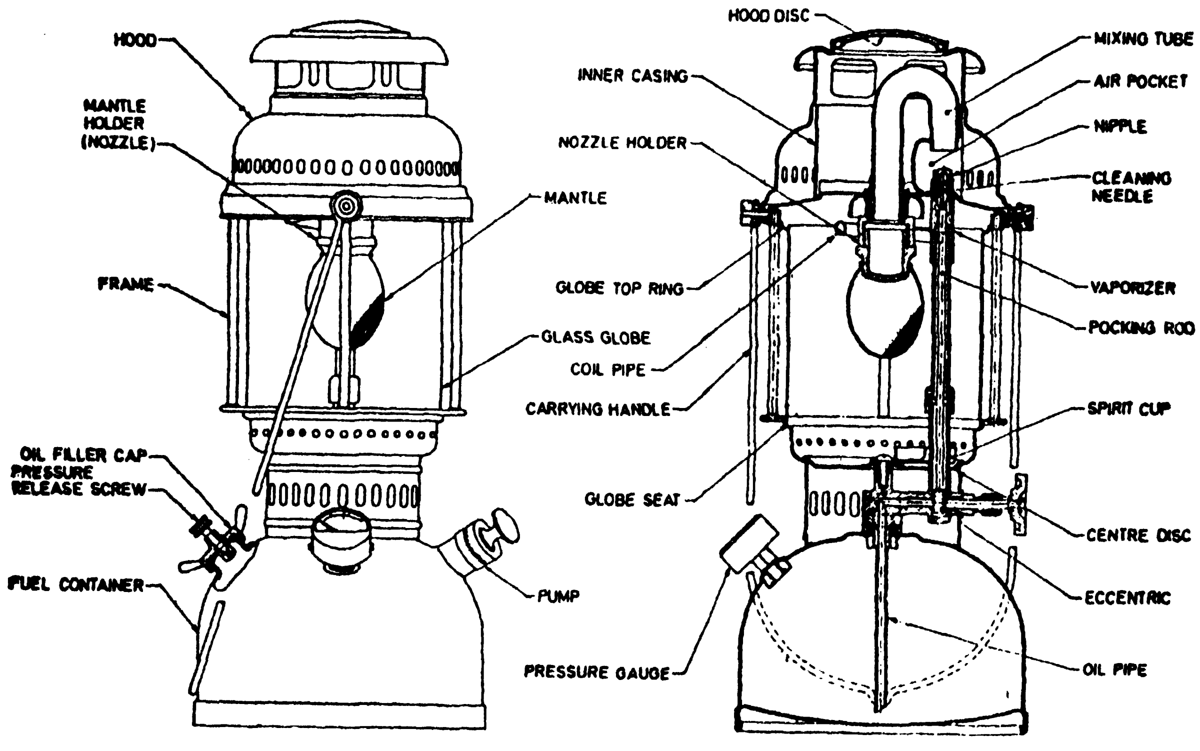


FIG. 1 TYPICAL OIL PRESSURE LANTERN

5.2 The following components of the lantern shall be made from materials specified against each:

Component	*Figure Reference*	*Material*
I. Vaporizer assembly:		
a) Nipple	1	Brass rod, conforming to IS 319
b) Cleaning needle	1	Steel wire, hard condition, conforming to IS 280, having a diameter of 0.125 mm for Size 1, 0.140 mm for Sizes 2 and 3A and 0.160 mm for Sizes 3B and 3C
c) Poking rod	1	Brass rod, conforming to IS 319, dia 3.15 mm
d) Extension piece		Brass rod, conforming to IS 319
e) Coil pipe	4A	Seamless brass tube, conforming to Grade CuZn37 of IS 407 or nickel silver conforming to Grade NS 10 or NS 12 of IS 2283
f) T-piece	4A	Brass conforming to IS 319
II. Fuel container:		
a) Upper portion	2	Annealed brass sheet, conforming to alloy designation CuZn37 of IS 410, 0.56 minimum thickness at any point
b) Bottom plate	2	Annealed brass sheet, conforming to alloy designation CuZn40 of IS 410, 0.80 minimum thickness at any point
III. Mixing tube	1	Seamless brass tube, conforming to Grade CuZn37 of IS 407
IV. Oil pipe	1	Seamless brass tube conforming to Grade CuZn37 of IS 407 or copper tube
V. Globe	1	Heat resisting glass (*see* **6.11** and **6.11.1**)
VI. Hood	1	Annealed brass sheet 0.560 mm thick, conforming to alloy designation CuZn37 of IS 410
VII. Globe seat	1	Brass sheet, 0.710 mm thickness conforming to alloy designation CuZn37 of IS 410

NOTE — Total maximum reduction in thickness (including of rolling tolerances of sheet) after fabrication shall be not more than 0.15 mm in case of Hood, Globe seat and Spirit cup.

5.3 Typical materials that are commonly used in the manufacture of other components are given in Annex B.

6 DESIGN, DIMENSIONS AND CONSTRUCTION

6.1 General

6.1.1 Oil pressure lanterns shall generally conform to the design shown in Fig. 1.

6.1.2 The dimensions of fuel container, pump, vaporizer arrangement, mixing tube and nozzle holder for the five sizes of oil pressure lanterns shall be as given in Fig. 2 to 6 respectively.

6.1.3 The fuel container shall be stress-relieved after fabrication but before soldering, to avoid season-cracking and shall withstand satisfactorily mercurous nitrate test as given in IS 2305.

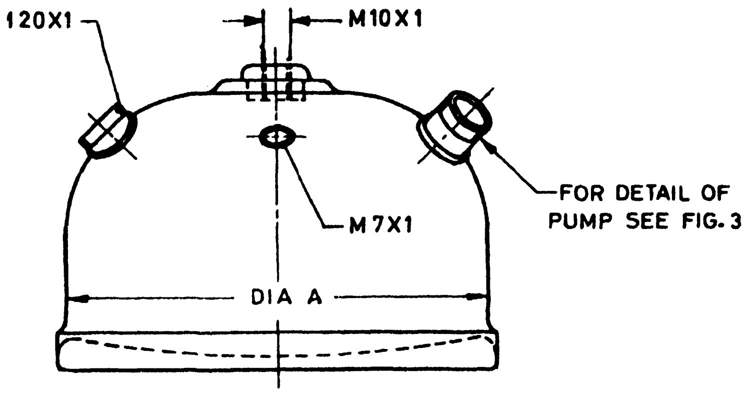
6.1.4 The following components of the oil pressure lantern shall be interchangeable for the same model and size of the lantern, without any adverse effect upon the performance and efficiency:

a) Vaporizer
b) Nipple
c) Mixing tube
d) Pump valve
e) Mantle holder
f) Oil filter cap
g) Pressure release screw
h) Pressure gauge
j) Pump cap
k) Globe
m) Nozzle holder

6.1.5 The construction of the lantern shall be sound to ensure durability, efficient performance and capability to withstand tests specified under **8.1**, **8.2**, **8.3** and **8.4**. It shall be so designed as to ensure safe handling and withstand rought usage during its reasonable life.

6.1.6 All metal-to-metal joints which have to withstand high temperature, shall be soundly brazed with any suitable brazing alloy having a high melting point (800 to 850°C). The brazed joints shall be sound and smooth and shall be free from cracks and other defects.

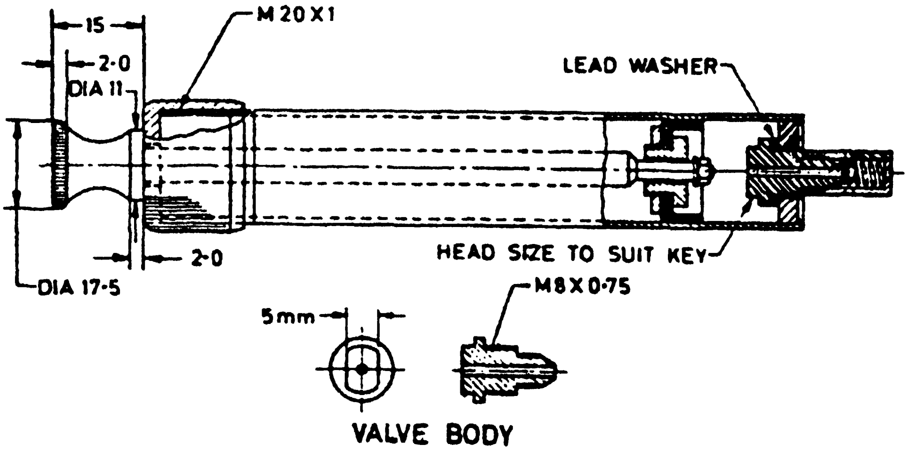
6.1.7 The parts shall be made accurately to ensure interchangeability. Consumable spare parts shall be made in such a way as to give a satisfactory fit. The mating of threaded components having less than and including 1 mm pitch shall be of medium class fit, whereas the components with more than 1 mm pitch shall be of free class fit.



Size (Designation)	*ø A*
1	120
2	150
3A, 3B, 3C	160

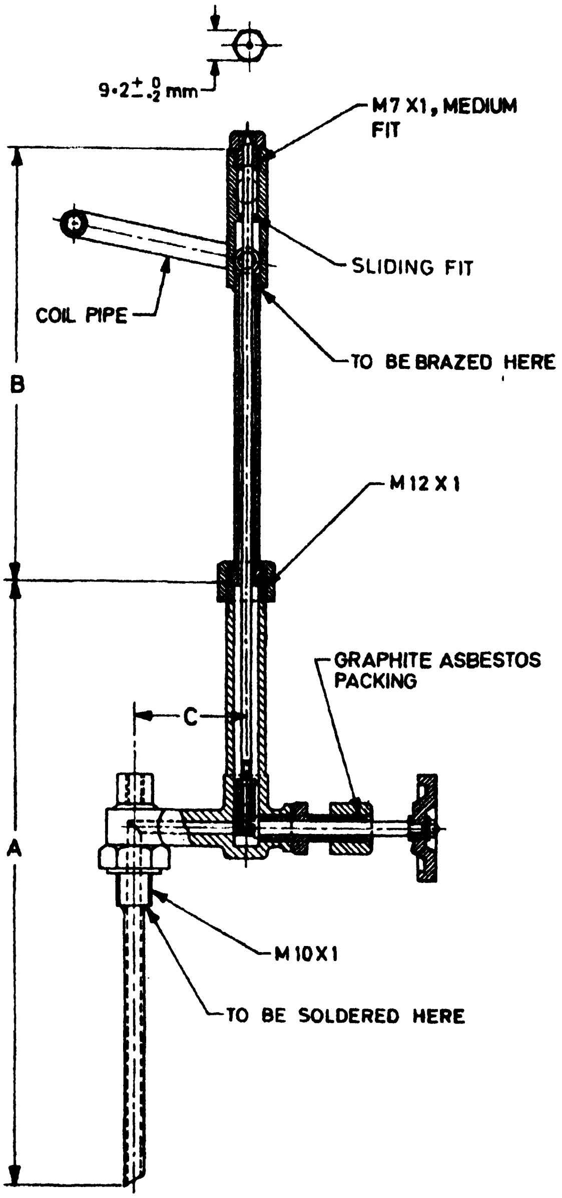
All dimensions in millimetres.

FIG. 2 FUEL CONTAINER



All dimensions in millimetres.

FIG. 3 PUMP

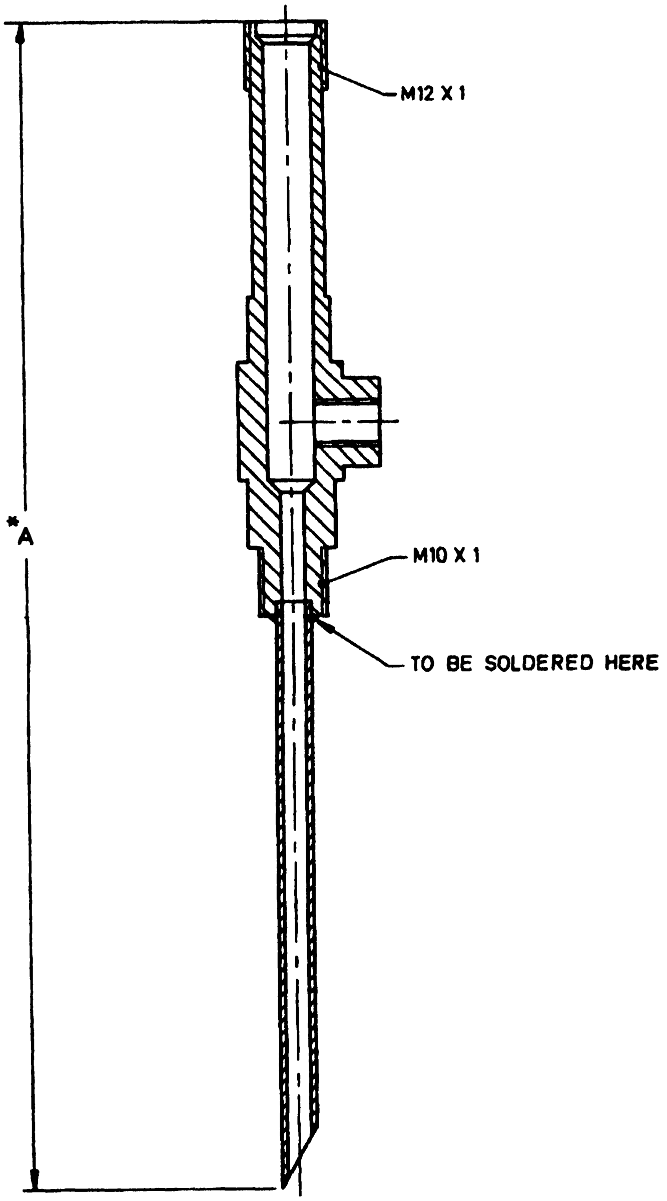


Size (Designation)	*A*	*B*	*C*
1	110	95	25
2	130	105	29
3A, 3B, 3C	175	125	32

All dimensions in millimetres.

4A Vaporizer (L-Shaped) Assembly

FIG. 4 VAPORIZER (*Continued*)



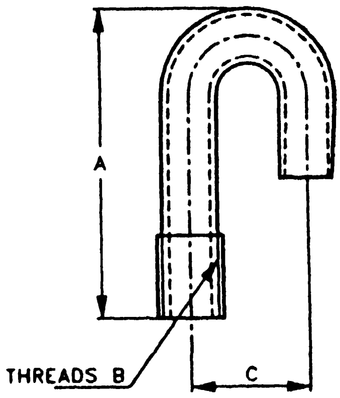
Size (Designation)	A mm	B mm	C mm
1	110	95	25
2	130	105	29
3A, 3B, 3C	175	125	32

* For dimensions *A*, *see* Fig. 4A.

All dimensions in millimetres.

4B Vaporizer Straight (Lower Portion)

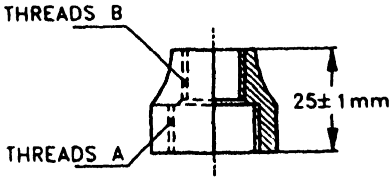
FIG. 4 VAPORIZER



All dimensions in millimetres.

Size (*Designation*)	*A*	*B* *ISO Metric Threads*	*C*
1	55	M10 × 1 or M12 × 1	25
2	76	M12 × 1.5 or M14 × 1.5	29
3A, 3B, 3C	86	M18 × 1.5	32

FIG. 5 MIXING TUBE



Size (*Designation*)	*ISO Metric Threads*	
	A	*B*
1	M16 × 2	M10 × 1 or M12 × 1
2	M22 × 2	M12 × 1.5 or M14 × 1.5
3A, 3B, 3C	M27 × 2	M18 × 1.5

FIG. 6 NOZZLE HOLDER

6.2 Fuel Container

The upper and bottom of the fuel container shall be either pressed or spun. Total maximum reduction in thickness (inclusive of rolling tolerance of sheet) after fabrication shall be not more than 0.15 mm.

6.2.1 The minimum capacity of the fuel container, when full up to the top of oil filler shall be as under:

Size (*Designation*)	*Minimum Capacity* ml
1	620
2	900
3A	1 400
3B	1 400
3C	1 400

6.2.2 Size 1 lanterns, when specified by the purchaser shall be provided with a knob diametrically opposite to the pump to facilitate handling of the lantern while pumping. The knob shall be of non-conducting material.

6.3 Vaporizer

6.3.1 *General Assembly*

The vaporizer may be L-shaped or straight (*see* Fig. 4A and 4B). The upper and the lower portions of the vaporizer tube shall be joined by means of a union joint. The construction of the unit shall be such that the parts readily fit into their correct position. The assembly of the vaporizer shall be such that the fuel vapour is thrown centrally inside the mixing tube.

6.3.2 *Nipple*

The orifice in the nipple shall be drilled straight and shall be free from burrs. The lower side of the nipple orifice shall be so designed as to facilitate easy entry of the pricker for cleaning. The nipple shall be so shaped as to enable the use of a spanner or key for unscrewing.

The nominal diameter of the orifice shall be as under:

Size (*Designation*)	*Orifice Diameter* mm
1	0.13 to 0.14
2	0.15 to 0.17
3A	0.18 to 0.20
3B	0.21 to 0.23
3C	0.24 to 0.26

6.3.3 *Poking Rod*

The poking rod shall have a sliding fit in the upper part of the vaporizer tube so that the oil goes from oil container to nipple through the coil pipe and not directly upwards.

6.3.4 Cleaning needle provided to clean the jet shall fit snugly on the poking rod.

6.3.5 *Eccentric*

6.3.5.1 While the lantern is burning, the eccentric operating the cleaning needle shall turn smoothly during the pricking of the nipple.

When worked 100 times, it shall not become jammed by the washer around it or by the eccentric pin working in the horizontal slot of the lower end of the poking rod or by fouling of the pin with the hole in the nipple. There shall be no leakage anywhere during or after the test.

6.3.5.2 Suitable clearance shall be provided for the play of the cleaning needle, but the clearance shall not be such as to allow kerosine oil to come out of the nipple hole in a stream when the needle is up within it. The quality of vapour coming out through the clearance between the cleaning needle and the hole shall not be such as to cause it to catch fire, when a flame is put on the nipple orifice, in the air pocket of the inner casing.

6.3.6 *Fuel Cut-off Valve*

The vaporizer shall be provided with a fuel cut-off valve, when specified by the purchaser.

6.4 Pump

The pump shall be of sound construction and shall be capable of developing and retaining a pressure of 245 kN/m^2 (2.5 kgf/cm^2). The non-return valve and the pump washer assembly shall be detachable.

6.4.1 When specified by the purchaser, pump knob shall be made of non-conducting material in Size 1 lanterns.

6.5 Mantle

It shall conform to IS 2788.

6.6 Mantle Holder (Nozzle)

Mantle holder shall conform to the requirements of IS 4957.

6.7 Pressure Gauge

6.7.1 Pressure gauge shall be of Bourdon tube type in which Bourdon tube used shall be seamless.

6.7.2 The dial shall be graduated to a minimum of 295 kN/m^2 (3 kgf/cm^2). A red mark shall indicate the pressure at which the lantern is intended to work, namely, 195 kN/m^2 (2 kgf/cm^2).

6.8 Pressure Release Screw

The fuel container shall be fitted with an effective means for allowing the operator to release the pressure in the container safely and quickly while the lantern is alight.

6.8.1 The pressure gauge, oil filler and pressure release screw may be combined in one.

6.9 Washers

6.9.1 The washer for oil filler cap shall be made from neoprene or other equally suitable material, which is resistant to heat and kerosine oil. It shall not become tacky or swollen when kept immersed in kerosine oil at 60°C for 24 h and shall be capable of giving leak-proof seal after the above test.

6.9.2 Pump washer shall be made from curried buffalo leather or other equally suitable material and shall be treated to avoid hardening and cracking.

6.10 Frame

The inside space of the frame shall be sufficient for conveniently fitting the globe. The dimensions of the frame shall be as under:

Size (Designation)	*Diameter of Top Ring*	*Distance Between Bottom Casing and Top Ring*	*Diameter of Lower Rim of Hood*
	mm	mm	mm
1	100 ± 1	87 ± 1	105 ± 1
2	116 ± 1	94 ± 1	122 ± 1
3A 3B 3C	139 ± 1	108 ± 1	144 ± 1

6.11 Globe

The globe shall have the following dimensions:

Size (Designation)	*Height* mm	*Diameter* mm
1	100 ± 1.5	75 ± 1.5
2	105 ± 1.5	90 ± 1.5
3A 3B 3C	115 ± 1.5	110 ± 1.5

6.11.1 The thickness of globe shall be reasonably uniform throughout. It shall be free from cracks and shall be substantially free from stones, blisters, air bubbles, cords and other visual defects.

6.12 Inner Casing

6.12.1 The air pocket (where the mixing of vapour with the air takes place) shall be situated in such a way that the air-vapour mixture does not get ignited by the burning mantle.

6.12.2 The two holes in the air pocket, one at top for the mixing tube and the other at bottom for the nipple on the vaporizer, shall be in perfect alignment.

6.13 Hood and Top

6.13.1 Requisite number of holes of proper size shall be provided at the bottom and top of the hood for adequate supply of air for efficient combustion of fuel and for the escape of products of combustion and to avoid over-heating of the mixing tube.

6.13.2 The hood top may be either detachable or permanently fixed or to the hood.

7 FINISH

7.1 The brass parts, except complete vaporizer unit (*see* Fig. 4), shall be coated with nickel plus chromium in accordance with Service Condition No. 3 of IS 1068. If required by the purchaser, the container, hood and hood top shall also be coated with chromium with nickel plus chromium in accordance with Service Condition No. 1 of IS 1068.

7.2 The mild steel components shall be either cadmium plated (*see* IS 1572) or nickel plus chromium coated in accordance with Service Condition No. 1 of IS 1068. Alternatively they may be zinc plated in accordance with Service Grade No. 2 of IS 1573 and passivated. The handle shall, however, be galvanized.

7.3 The surfaces responsible for reflection of light shall be given a bright polished finish.

8 TESTS

8.1 Pressure Tests

8.1.1 *Air Pressure Test*

Each fuel container fitted with the oil filler cap and vaporizer assembly, but without pressure gauge, shall be snap tested to a pressure of 245 kN/m^2 (2.5 kgf/cm^2). It shall not show any sign of leakage, deformation or damage.

8.1.2 *Safety Pressure Test*

One fuel container, without vaporizer, pump valve and pressure gauge, shall be selected at random out of a lot of 500. It shall be subjected to an internal hydraulic pressure of 590 kN/m^2 (6 kgf/cm^2) for a period of 5 min. The container shall not show any sign of leakage.

8.1.3 *Bursting Pressure Test*

The container tested for safety pressure (*see* **7.1.2**) shall be further subjected to a hydraulic pressure of 785 kN/m^2 (8 kgf/cm^2). It shall neither burst nor unduly distort. Slight leakage of the hydraulic fluid shall, however, be permissible, provided the pressure is capable of being maintained for a duration of not less than 5 min.

8.2 Performance Tests

8.2.1 *Luminous Intensity*

The mean horizontal luminous intensity of the lantern, when determined by the method described in Annex C, shall be not less than 90 percent of the rated luminous intensity of the lantern given in candelas.

8.2.2 *Lighting Efficiency*

The lighting efficiency of the lanterns, that is, the mean horizontal luminous intensity in candelas per gram of kerosine per hour shall be not less than three for all sizes of lanterns.

8.2.3 *Duration of Burning for One Fill*

With the fuel container filled to 75 percent of its capacity, the lantern shall be operated at a pressure of 195 kN/m^2 (2 kgf/cm^2). The duration of burning shall be not less than the following:

Size (*Designation*)	*Burning Duration* h
1	5.5
2	6.5
3A	9
3B	8
3C	7

8.3 Thermal Tests

8.3.1 *Surface Temperature*

The surface temperature of any part of the lantern that may be necessary to touch during its operation shall not exceed 60°C, and shall preferably be lower.

8.3.2 *Carrying Handle Temperature*

The length of the carrying handle shall be such that when a piece of black card, measuring 100 mm × 50 mm held horizontally 25 mm below the top of the handle in stir air, while the lantern is operating, the black card shall not attain a temperature exceeding 66°C.

8.4 Storm Proofness Test

The lantern shall function properly when exposed to a wind of 70 km/h for a period of not less than 5 min during its operation.

9 SAFETY

Oil pressure lanterns, both when full of fuel and when empty, shall be capable of being tilted in any direction to an angle of 15° from the vertical without overturning on being released.

10 QUALITY OF KEROSINE

The kerosine to be used in conducting performance tests mentioned in 7.2 shall be free from water or suspended material.

11 MARKING

11.1 The lanterns shall be stamped with the designation, luminous intensity, the name or registered trade-mark of the manufacturer and the country of origin.

11.1.1 The oil pressure lanters may also be marked with Standard Mark.

The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

12 SPARES AND ACCESSORIES

12.1 Each lantern shall be supplied with:

a) a spirit can,
b) a spanner,
c) a nipple,
d) two cleaning needles,
e) an oil filler cap washer,
f) three mantles,
g) a needle key,
h) a pump washer, and
j) a pamphlet containing manufacturer's instructions for use.

13 PACKING

13.1 Each lantern, with its spares and accessories, shall be packed in a strong cardboard box, the hood being protected by a cardboard ring. For transit, 12 such lanterns in cardboard boxes shall be packed in a strong wooden case. A list of spares and accessories provided along with the lantern shall also be supplied along with.

14 SAMPLING

The sampling plan may be adopted as agreed between manufacturer and purchaser based on IS 2500 (Part 1) and IS 2500 (Part 2).

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
280 : 1978	Mild steel wire for general engineering purposes (*third revision*)
304 : 1981	High tensile brass ingots and castings (*second revision*)
319 : 1989	Free cutting brass bars, rods and sections (*fourth revision*)
407 : 1981	Brass tubes for general purposes (*third revision*)
410 : 1977	Cold rolled brass sheet, strip and foil (*third revision*)
513 : 1994	Cold-rolled low carbon steel sheets and strips (*fourth revision*)
1068 : 1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium (*third revision*)
1459 : 1974	Specification for kerosine (*third revision*)
1572 : 1986	Electroplated coatings of cadmium on iron and steel (*second revision*)
1573 : 1986	Electroplated coatings of zinc on iron and steel (*second revision*)
2062 : 1992	Steel for general structural purposes (*fourth revision*)
2283 : 1981	Nickel silver sheet, strip and foil (*first revision*)
2305 : 1988	Method for mercurous nitrate test for copper and copper alloys (*first revision*)
2500 (Part 1) : 1992	Sampling inspection procedures: Part 1 Attribute sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection (*second revision*)
2500 (Part 2) : 1965	Sampling inspection procedures: Part 2 Inspection by variables for percent defective
2788 : 1981	Gas mantles (*first revision*)
4957 : 1968	Mantle holders, nozzle type

ANNEX B

(*Clause* 5.3)

MATERIALS COMMONLY USED IN THE MANUFACTURE OF COMPONENTS OF OIL PRESSURE LANTERNS, OTHER THAN THOSE SPECIFIED IN CLAUSE 5

Component	*Recommended Material*
Carrying handle	Mild steel wire, 4.00 mm diameter, conforming to IS 280
Centre disc	Steel sheet, 0.900 mm thick, conforming to Grade D of IS 513
Hood disc	Mild steel, conforming to IS 2062
Inner casing	Steel sheet, 0.710 mm thick, conforming to Grade D of IS 513
Lantern frame:	
a) Globe top ring	Annealed brass sheet, 0.710 mm thick, conforming to Grade designation CuZn37 of IS 410
b) Rods, screws for handle, nuts and washers	Brass rod conforming to IS 319
Mountings on fuel container	When made from seamless brass tube: conforming to Grade CuZn37 of IS 407 When made from sheet: conforming to alloy designation CuZn37 of IS 410 When made from rod: conforming to IS 319 When cast: conforming to Grade HTB1 of IS 304
Pump:	
a) Barrel	Seamless brass tube, conforming to Grade CuZn37 of IS 407
b) Valve body	Brass rod, conforming to IS 319
c) Rod	Brass rod, conforming to IS 319, or steel rod conforming to IS 2062
d) Valve	Velvet cork or synthetic rubber resistant to kerosine oil

ANNEX C

(*Clause* 8.2.1)

MEASUREMENT OF MEAN HORIZONTAL LUMINOUS INTENSITY

C-1 PHOTOMETRIC EQUIPMENT

C-1.1 The mean horizontal luminous intensity of the lantern shall be measured against a metal filament sub-standard electric lamp, mounted on a standard photometer bench, with a suitable form of photometer head.

C-2 PROCEDURE FOR MEASUREMENT

C-2.1 The fuel container of the lantern shall contain approximately 75 percent of the amount of fuel held when full, and the glass globe of the lantern shall be cleaned before the commencement of the test.

C-2.2 The lantern shall be lit and allowed to burn at the working pressure of 195 kN/m^2 (2 kgf/cm^2) for at least half-an-hour to attain a steady condition.

C-2.3 The lantern shall be mounted on a table fixed in one of the carriages of the photometer bench. The middle portion of the mantle, photometer head, and the sub-standard electric lamp, shall be in the same horizontal plane and the photometer head shall be placed perpendicular to the incident light from the mantle. The sub-standard lamp and the photometer head shall be kept fixed at any convenient position on the bench.

C-2.4 The lantern shall be moved to and fro on one side of the photometer head, until the position of balance is found. Measurement shall be made in a horizontal plane by changing the position of lantern in four directions, at right angle to the axis of the appliance, differing by 90°. A number of readings in each direction shall be taken and the average of all these measurements in the four directions shall be taken as the final value.

C-2.5 The temperature and the relative humidity of the test room shall be reported along with the tests.

Bureau of Indian Standards

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

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